Rein in the Runoff

Citizens Guide to Stormwater
January 2010

Rein in the Runoff was a project led by researchers at Grand Valley State University's Annis Water Resources Institute to identify social, economic, and environmental causes and consequences of stormwater runoff in Spring Lake, the Grand River, and ultimately, Lake Michigan.

This Integrated Assessment was funded by Michigan Sea Grant to examine the current conditions in the Spring Lake Watershed, and to apply current scientific standards to answer the policy question posed by local communities:

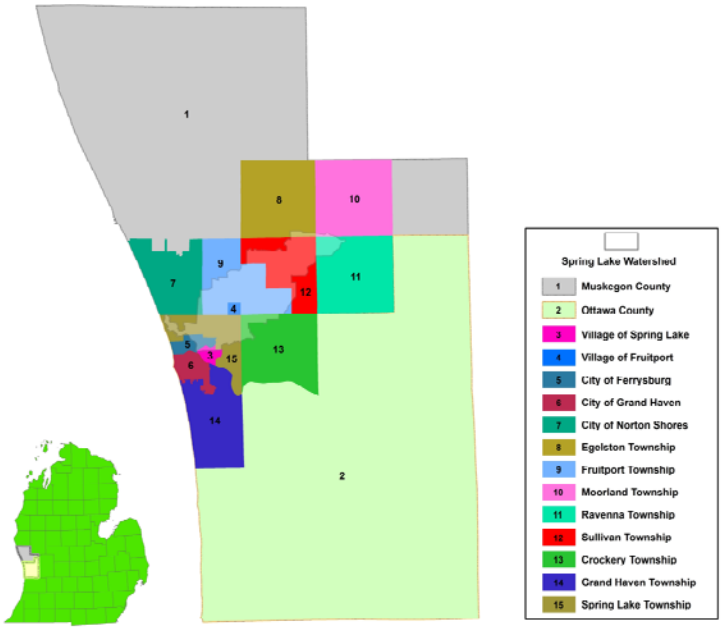
> *What stormwater management alternatives are available to the communities in the Spring Lake Watershed that allow for future development and also mitigate the effects of stormwater discharges and improve the water quality in Spring Lake, the Grand River, and ultimately, Lake Michigan?*

The Rein in the Runoff project goals were to:

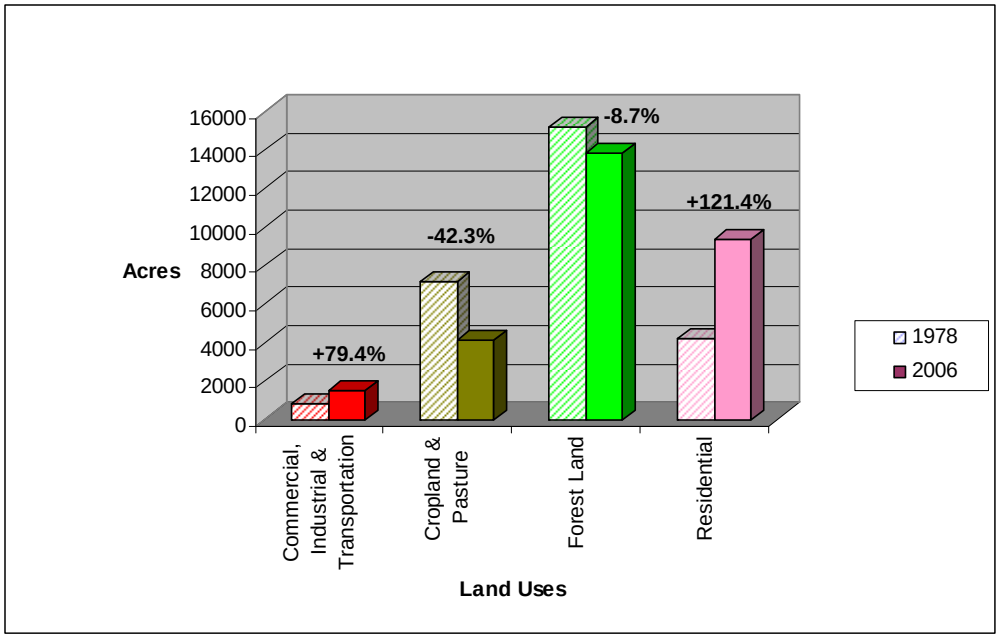
- Identify corrective actions and alternatives to current stormwater management to improve water quality in the community.
- Help local government leaders make informed decisions about stormwater management.
- Educate citizens and business owners and provide ideas for individual actions to improve local water quality.

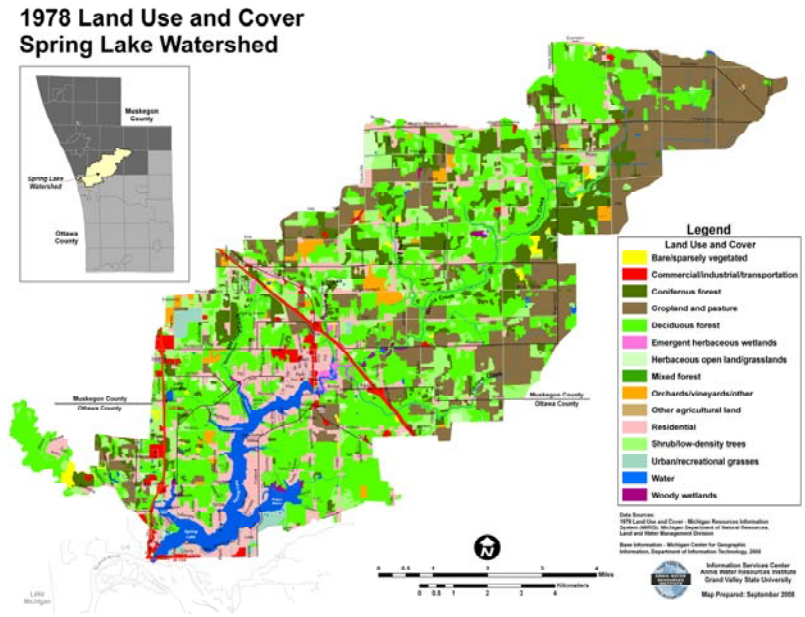
Growth and Development in the Spring Lake Watershed

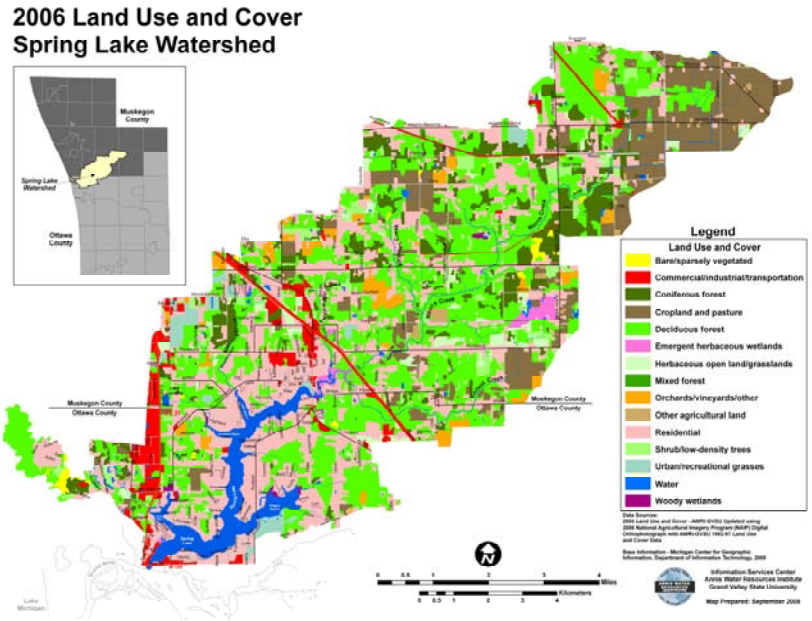
The Rein in the Runoff project looked at stormwater runoff problems in and downstream of the Spring Lake Watershed. A watershed is an area of land that drains into a body of water – i.e. Spring Lake. There are 13 communities that make up the Spring Lake Watershed, and two downstream of where Spring Lake flows into the Grand River as it flows to Lake Michigan.



The Spring Lake Watershed is located in one of the only regions in Michigan to see continued population growth between 2000 – 2010. Residential and commercial development has increased, and the watershed has lost forested and agricultural lands.







A look at the land use and land cover change from 1978 to 2006 within the Spring Lake Watershed shows this dramatic increase in developed land, particularly closer to the lake.

This type of development increases the amount of land that is covered by hardened – and less natural - surfaces, especially closer to Spring Lake. These impervious areas prevent rainwater from soaking into the ground.

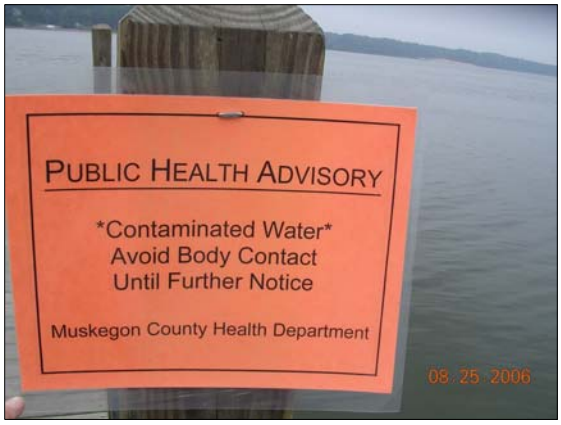
When rain cannot soak into the ground it “runs off” these hard, impenetrable surfaces into local waterways – either indirectly through storm drains, or directly from road ends, parking lots, rooftops, and lawns.

Stormwater Problems in the Spring Lake Watershed

As rainwater flows over the hardened – impervious – surfaces that come with urbanization and development, it collects pollutants and dumps them into Spring Lake, the Grand River, and eventually, Lake Michigan. Different pollutants cause different water quality and water quantity problems:

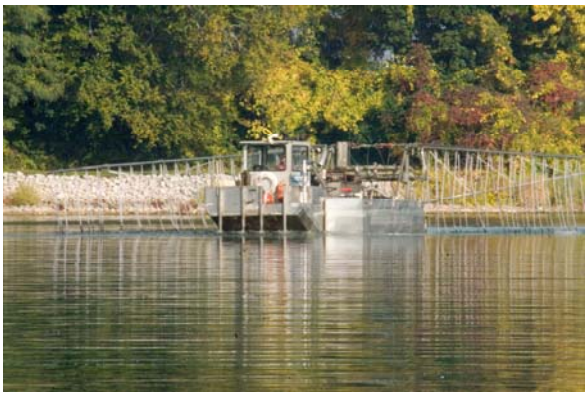
- Fertilizers can cause too much algae to grow – as they die off, the oxygen in the water can be depleted by the organisms decomposing the algae, which can kill fish and other wildlife
- Soaps (from washing your car) can hurt fish gills and scales
- Chemicals can damage plants and animals

- Dirt from erosion – or sediment – can smother fish habitat
- Excess water that cannot soak into the ground contributes to and aggravates flooding problems
- Pathogens in the water can lead to beach closings and illnesses
- Water gets heated from running over impervious surfaces and can increase stream temperatures and kill fish



There are real costs to society to address these types of water quality and quantity problems. Some examples of these costs include:

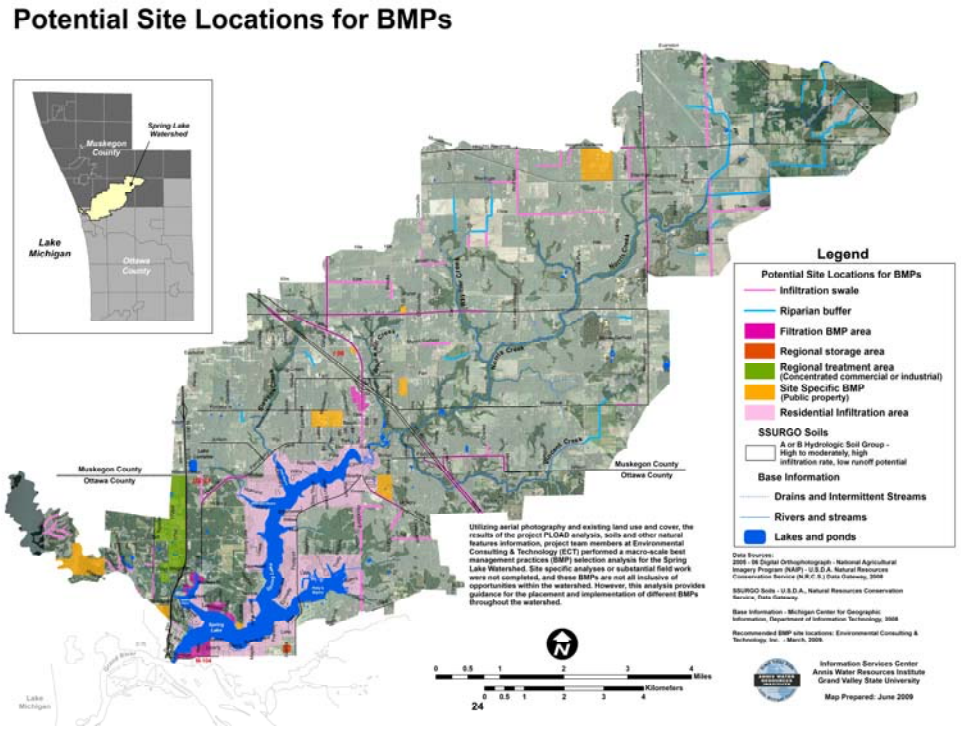
- Communities that use surface water for their drinking water supply must pay more to clean up polluted water
- Flooding causes damage to homes, roads, and other infrastructure
- Residents in Spring Lake paid for an alum application to control algae blooms



Potential Solutions

The application of a combination of structural practices and nonstructural tools – particularly Low Impact Development (LID) strategies – to new and existing development throughout the Spring Lake Watershed will be necessary to prevent the continued degradation of water quality in Spring Lake and its adjoining waterways, including the Grand River and Lake Michigan.

The stormwater management priorities for the Spring Lake Watershed include the restoration of waterfront buffers; implementation of LID practices in the areas that contribute the highest pollutant loads to Spring Lake, which according to the Rein in the Runoff model results are the urbanized sub-watersheds closest to the lake; and road ends immediately adjacent to the lake or other waterway.



"Best management practices" – or BMPs – are stormwater control measures that slow, retain or absorb nonpoint source pollutants associated with runoff. When placed in these priority areas throughout the watershed, these BMPs can help control stormwater pollution in our local waterways.

The selection of tools – or BMPs – is ultimately up to each individual or municipal landowner. However, the Rein in the Runoff project team offers the following guidance:

- Vegetated/bio-swales are suitable for installation along roadways. Swales and constructed wetlands, are the most cost-effective practices

- Grow zones, including riparian and littoral buffers, are relatively inexpensive, with installation costs ranging from $200 - $800 per acre, and annual maintenance costs ranging from $4 – 200 per acre

- Rain gardens are suitable for installation in residential neighborhoods, parks, schools, and other small site. They also have relatively low implementation costs, and their smaller footprint makes them well-suited for areas where land is available but not abundant

- Green roofs and pervious pavement are more expensive to implement, and the pollution control benefits, educational opportunities, energy cost savings, etc., should be evaluated on a site-by-site basis

- Rain barrels cost $25 - $200 in West Michigan. In addition to the stormwater control benefits they provide, rain barrels can also reduce the household consumption (and monthly cost) of water for irrigating lawns and gardens

- Tree plantings in new developments can reduce the need for additional stormwater infrastructure. Additional benefits associated with tree plantings include limited increases in property values, pollution reduction, cooler runoff temperatures, and energy saving benefits during the cooling season

- Publicly-owned properties present educational opportunities for the installation of stormwater controls without complicated land ownership concerns

- In densely developed areas, controls that store stormwater on a regional basis might be most effective (e.g., retention basins)

- Nonstructural tools, such as ordinances (stormwater, fertilizer, high density development and other changes to traditional zoning rules), animal waste management programs, stormwater utilities, and stakeholder education, should be encouraged for implementation throughout the Spring Lake Watershed.

For additional information about the Rein in the Runoff Integrated Assessment Project, visit our website: http://www.gvsu.edu/wri/reinintherunoff.

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